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ROLE OF HOME GARDEN IN IMPROVING HOUSEHOLD DIET DIVERSITY AND CHILD NUTRITIONAL STATUSES: THE CASE OF WOREDA 01, IN NIFAS SILK LAFTO SUB CITY

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DECLARATION

I, **Goshu Seifu Haile,** hereby declare to Addis Ababa University School of Graduate Studies that this thesis report is a product of my original research work, and it has not been submitted to any other university for any academic degree. Materials and information other than my own are dually acknowledged.

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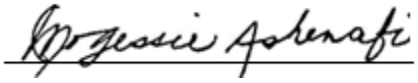
As a Supervisor of this Research, I certify that I have read and checked this research prepared by Goshu Seifu entitled ‘’Role of Home Garden in Improving Household Diet Diversity and Child Nutritional Status: the cased of Woreda 01 (Lebu) in Nifas Silk Lafto Sub City, Addis Ababa, Ethiopia” for the Master of degree in Food Security and Development studies.

Mogessie Ashenafi (Prof.) 

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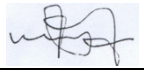
Dr. Abebe Haile  22/102021

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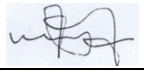
Dr. Abebe Haile  22/102021

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Final approval and acceptance of this thesis is contingent upon the candidate’s submission of the final copy of the thesis, incorporating all the comments by Examining Board, to the Council of Graduate Studies (CGS) through the Centre Academic Committee (CAC) of the Centre.

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Acronyms and Abbreviations

AA	Addis Ababa
AACA	Addis Ababa City Administration
AAU	Addis Ababa University
CDDS	Child diet diversity
CSA	Central Statistics Authority
FAO	Food and Agriculture Organization
FDRE	Federal Democratic Republic of Ethiopia
FGD	Focus Group Discussion
H/A	Height for age
HAZ	Height-for-age z-scores
HDDS	Household Dietary Diversity Score
HFIAS	Household Food Insecurity Access Scale
HG	Home garden
hh	households
IDDS	Individual Diet diversity
IFAD	International Fund for Agriculture Development
IFPRI	International Food Policy Research Institute
NHG	Non Home Garden

NNP	National Nutrition Program
KII	Key Informant Interview
MoA	Ministry of Agriculture
UNICEF	United Nations Children's Fund
UPA	Urban and Peri-urban Agriculture
USAID	United States Agency for International Development
WDDS	Women Diet Diversity
W/A	Weight for Age
WAZ	Weight-for-Age z-scores
W/H	Weight for Height
WFP	World Food Program
WHO	World Health Organization

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Abstract

Food and nutrition security remains the high priority programs for the Government of Ethiopia because 38% of children under age five were stunted, 10% were wasted, 24% were underweight in the country. *Stunting in Addis Ababa is 22%, as the result the Addis Ababa City Government Urban Agriculture Office and many other local non-governmental organizations promoted home gardens in Addis Ababa to improve the food and nutrition security of poor households. This research was conducted in Addis Ababa City Administration, Nifas Silk Lafto Sub City, Woreda 01 (Lebu) with the objective to assess the role of home garden on household dietary diversity and child nutritional statuses. The total of 230 households with equal number of sample from home garden households and non- home garden households were surveyed using the household food insecurity access scale, diet diversity score and anthropometric measurement of under five children. Both the qualitative and quantitative data was collected and analyzed. It was found that the size of the home garden varies from 12 meter square up to 300 meter square, based on the land availability. Plant composition was almost the same across the home gardens growing vegetables like kale, Swiss chard, Lettuce, Cabbage, Beet root, Carrot, Potato and Tomato. Home gardens were managed throughout the year using irrigation water from the tap water and from nearby rivers. The research found that home gardens provide supplemental sources of diverse fresh and nutritionally rich vegetables for home consumption and selling extra produces. And, contributed for the diet diversity improvement, income generation, and improved children nutritional statuses. The most important constrains identified by the research were land and water shortage, lack of inputs, lack of market information and advisory services, sustainability problem, lack of attention by the households, weeds and insect pests and diseases. There is a great need for capacity building, implement research with increased focus on nutritional aspects, soil and pest management, composting, and integration of livestock to enhance the productivity and profitability of home gardens.*

***Key words**: Home Gardens, Food Security, Nutrition, Income generation, Diet Diversity*

CHAPTER ONE: INTRODUCTION

1.1 Back Ground of the Study

Malnutrition in all its forms is a global problem that affects almost every country in the world, leading to serious public health risks and incurring high economic costs (IFPRI, 2014). Under nutrition contributes to around 45% of deaths among children under five, mainly in low and middle-income countries (WHO, 2018). It causes a social and economic problem, holding back development across the world with unacceptable human consequences. For example, obesity is projected to cost USD two trillion annually, including loss of economic productivity and direct health care costs worldwide, while under-nutrition will reduce GDP by up to 11% in Africa and Asia (WHO, 2020).

Micronutrient malnutrition is an important dimension of food and nutrition insecurity and is caused by the lack of adequate micronutrients (vitamins and minerals) in the diet (FAO, 2011b). This is common in developing countries because their diets are starchy staples with little or no fresh fruits and vegetables and lack of dietary diversity is a severe problem (Tuel, 2003). More than two billion people suffer from a serious lack of vitamins and minerals and more than 200 million children are stunted or wasted (Global Panel, 2014). Deficiencies of essential vitamins have substantial adverse effects on child survival and development. Deficiencies of vitamin A and zinc adversely affect child health and survival, and deficiencies of iodine and iron contribute to children not reaching their developmental potential (Lancet, 2013). The deficiencies of micronutrient are a major obstacle to socio-economic development in many countries because it has an immense impact on the health of the population, learning ability and productivity and contribute to a vicious cycle of malnutrition (FAO, 2010b). Children stunted in the first two years of life will have low capacity to resist disease, to carry out physical work, to study in school, and are impaired across their life course (Shrimpton and Rokx, 2012).

Vitamin A deficiency is the leading cause of preventable blindness in the world (Faber and Laurie, 2014). And, children who are vitamin A-deficient have lower resistance against common childhood infections such as respiratory and diarrheal diseases, measles and malaria. Home gardens of fruits and vegetables play an important role in fulfilling dietary diversity and nutritional

needs by providing households with direct access to food that can be produced and consumed by household members, often on a daily basis (Pradhan, 2018). They are generally located in a small area near the residence with high diversity of plants. Home gardens are a time-tested local strategy that are widely adopted and practiced by local communities with limited resources and institutional support (Galhena et al, 2013).

1.2 Statement of the Problem

Malnutrition remains an important public health concern and one of the main causes of early child morbidity and mortality in developing countries. It is among the most series health problem facing in Ethiopia (Getaneh, et al, 2016). The 2016 Ethiopian Health and Demographic Survey report indicated that 38% of children under age five were stunted, 10% were wasted, 24% were underweight, and 1% were overweight (CSA and ICF, 2016). In Ethiopia, the average person eats just 42kg of fruit and vegetables per year; this data is far below the WHO recommendation of 146kg per year (Hirvonen and Headey, 2020). Poor quality diets are the main underlying causes for non-communicable diseases in Ethiopia. However, despite, fruit and vegetables are important sources of vitamins and minerals; they are often too expensive and unaffordable for most poor communities in Addis Ababa.

Lack of dietary diversity and micronutrient-dense food consumption, and problematic child feeding practices contribute to the high rates of child under nutrition in the country (USAID 2014)). Only half of infants are exclusively breastfed and introduced to complementary foods at the appropriate time, and only 4%of young children are receiving a minimal acceptable diet. Children in rural areas are more likely to be stunted (46%) than those in urban areas (36%), and great regional variations persist, with Amhara 52%, Tigray 51% percent, Affar50%, and Benishangul-Gumuz 49%, while Addis Ababa 22% and Gambela 27% have the lowest rates (USAID, 2014).

Moreover, as more people move into urban areas, consumption of food and other goods and services increased. This creates problem in food security, diet diversity, and nutritional intake (FAO 2009). Consequently, Children and women are suffering from low food intake, diet diversity and malnutrition. Thus, it becomes imperative to adapt or develop new strategies that could help

in producing food within and around urban areas with little ecological impact and rich nutritional values.

In order to address the issues with regard to household food insecurity and malnutrition, the Federal Democratic Republic Government of Ethiopia, Urban Development and Construction Ministry had developed Urban Agriculture Strategy (FDRE, 2018). In line with this program, Addis Ababa City Government Urban Agriculture Office and many local non-governmental organizations promoted home gardens by raising awareness, distributing planting materials, and providing training, as part of the Urban Agriculture program. The impact of Urban Agriculture on improving food security, increasing income, ecological benefits has been widely studied (Endale, 2011; Sophia, 2015; Teferi, 2015). However, scientific evidence of the value of home garden production of fresh vegetables to enhance household diet diversity and child nutrition is still limited in Ethiopia, especially in urban areas. Therefore, this research assessed the contribution of home garden to child nutrition and household diet diversity in Addis Ababa.

1.3 Objective of the study

1.3.1 General Objective of the Study

Overall objective of the study was to assess the role of home garden in improving the household dietary diversity and child nutritional status in Woreda 01 Nifa Silk/Lafto Sub City, Addis Ababa, Ethiopia, 2021.

1.3.2 Specific Objectives of the Study

The specific objectives of the study were to:

- Assess the role of home garden to improve dietary diversity of the hhs of the study area
- Assess the role of home garden in improving the nutritional status of <5 children in the study area
- Assess the contribution of home garden on hhs food security and income of the study area
- Assess the Knowledge, attitude and practice of hhs on micro nutrients provided by home garden of the study area

- Examine constraints and opportunities of home garden in the study area

1.4 Research Questions

- Does homestead garden improve hhs dietary diversity in the study area?
- Does homestead garden contribute to improvement of <5 child nutritional status in the study area?
- Does home garden contribute for hhs food security status in the study area?
- What is the level of the Knowledge, Attitude and Practice (KAP) of hhs on home garden to improve household nutrition in the study area?

1.5 Significance of the Research

This study was important particularly in the light of the challenges posed by malnutrition and with the interest of expanding the culture of diet diversity, localizing food production and the need for healthy living in Addis Ababa, Ethiopia. The study assessed the role of home garden, specifically vegetable gardens, for the household diet diversity and children nutrition improvement. In addition, constrains and opportunities examined by this research and recommendations forwarded that would help for effective home garden programming. Therefore, this research had found some useful evidences on the importance of home gardens and its areas of improvement for better future programming.

1.6 Operational Definitions of Terms

Food security: Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO,2001).

Micronutrient: nutrients that are needed by human body in minute quantities for growth, development and maintenance (FAO, 2011).

Malnutrition: According to WHO (2020), malnutrition refers to deficiencies, excesses or imbalances in a person's intake of energy and/or nutrients. The term malnutrition covers 2 broad groups of conditions. One is 'undernutrition'—which includes stunting (low height for age), wasting (low weight for height), underweight (low weight for age) and micronutrient deficiencies or insufficiencies (a lack of important vitamins and minerals). The other is overweight, obesity and diet-related non-communicable diseases (such as heart disease, stroke, diabetes, and cancer).

Dietary diversity: Dietary diversity is a qualitative measure of food consumption that reflects household access to a variety of foods and is also a proxy of nutrient adequacy of the diet of individuals (FAO, 2011). Dietary diversity is the number of different foods or food groups consumed over a given reference period (Swindale and Bilinsky, 2006).

Stunting: being short for age measured as height for age were defined by Z-score less than two standard deviation (-2SD) below the median of reference population are considered short for their age. It is a sign of chronic undernutrition that reflects failure to receive adequate nutrition over a long period (EDHS,2016).

Wasting: Refers to thinness and it is measured as weight-for-height at least 2SD below the median of a reference population. A measure of acute undernutrition that represents the failure to receive adequate nutrition and from illness that caused weight loss. It describes the current nutritional statuses (EDHS, 2016).

Underweight: children whose weight for age Z-score less than - 2 standard deviation (2SD) below median of the reference population. It may indicate wasting or stunting (EDHS, 2016)

Knowledge: Refers to an individual's understanding of nutrition, including the intellectual ability to remember and recall food- and nutrition-related terminology, specific pieces of information and facts (Macías and Glasauer, 2014).

Practice: Is defined as the observable actions of an individual that could affect his/her or others' nutrition, such as eating, feeding, washing hands, cooking and selecting foods (Macías and Glasauer, 2014).

Attitude: Attitudes are emotional, motivational, perceptive and cognitive beliefs that positively or negatively influence the behavior or practice of an individual. An individual's feeding or eating behavior is influenced by his/her emotions, motivations, perceptions and thoughts. Attitudes

influence future behavior no matter the individual's knowledge and help explain why an individual adopts one practice and no other alternatives (Macías and Glasauer, 2014).

Home Garden: There is no standard definition for a home garden. According to Galhena et al, (2013) "the household garden is a small-scale production system supplying plant and animal consumption and utilitarian items either not obtainable, affordable, or readily available through retail markets, field cultivation''.

Generally, home gardening refers to the cultivation of a small portion of land which may be around the household or within walking distance from the family home. Home gardens can be described as a mixed cropping system that encompasses vegetables, fruits, plantation crops, ornamental and medicinal plants that can serve as a supplementary source of food and income (Galhena et al, 2013).

1.7 Conceptual Frame Work of Child Malnutrition

A conceptual framework is a visual representation of an expected relationship between variables. And, variables are simply the characteristics or properties that the researcher wanted to study. A conceptual framework is used in a research paper to explain the key concepts or variables and the relationships between them that need to be studied (Maxwell, 2005). So, the below conceptual framework shows the relationship between the dependent and independent variables. And how the independent variable such as socio economic statuses including the income, occupation, garden establishment, knowledge, can influence the dependent variables- child nutritional statuses and household diet diversity.

The conceptual framework of this research shows the relationship between the dependent and independent variables. And, how the independent variable such as socio economic statuses including the income, occupation, garden establishment, knowledge, can influence the dependent variables- child nutritional statuses and household diet diversity.

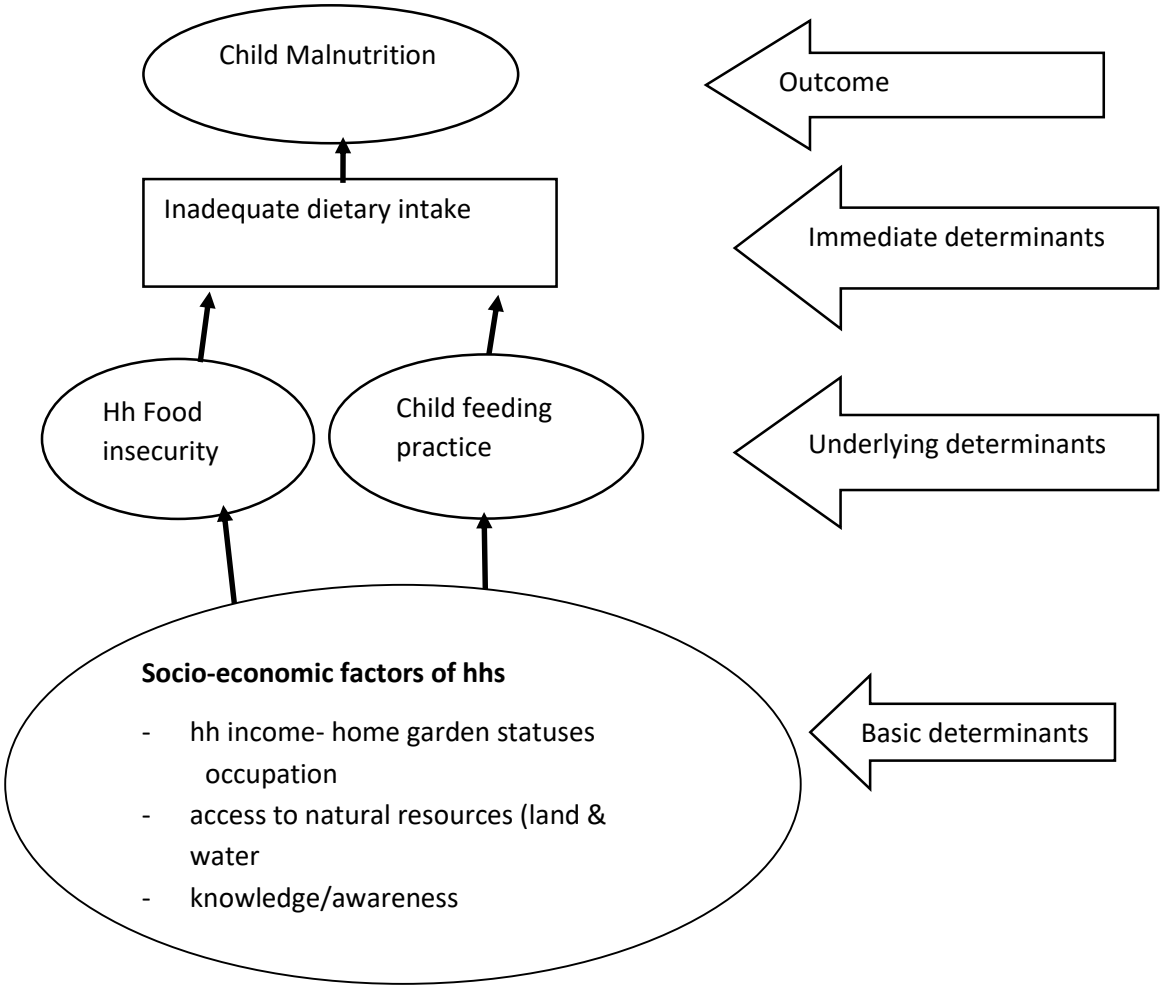

Figure 1. A Conceptual framework: Modified from UNICEF (1991)

2.8. Scope and Limitation of the Study

2.8.1 Scope of the study

The research examined the role of home gardens in improving household diet diversity and children nutrition in Nifas Silk Lafto Sub City, specifically in woreda 01, Addis Ababa, Ethiopia. The study took sample from home garden beneficiaries who have been managing vegetables growing with support from the woreda urban agriculture office for home consumption purpose. The contribution of home garden to household food security and nutrition improvement was assessed using the anthropometric measurement and household food insecurity access score. In

fact, the different aspects like the contribution of home garden on income and food security and the knowledge, attitude and practice of the community on home garden was assessed in the research.

2.8.2 Limitation of the Study

The food security data and the diet diversity data was collected using the 30 days and 24-hour recall period respectively. The data depends on the memory of the respondents, so the data might not accurate. The food insecurity access scale measurement that was taken from the 30 days' recall period might not be remembered properly. In addition, the diet diversity measurement tells only the last 24-hour consumption and doesn't tell the number of food groups consumed by an individual or a household on the previous days. The socio economic statuses of respondents collected from two group may differ between those who have garden and from households having no home garden. Because being poor was one of the selection criteria while targeting for home garden by the woreda though samples from the two groups selected from the same woreda. So, there might be economic difference between the two groups. There was no baseline data to compare the current food security and nutritional statuses of households engaged on home gardening. Comparison was made with different households who reside in the same kebele who were randomly met and interviewed. Shortage of previous similar local studies was the other limitation. There was limitation of local research related to home garden to children nutritional statuses in similar socioeconomic group. Most of the previous local researches were related to urban agricultures contribution to the income generation and livelihood improvement. The study was limited to only in one woreda in a sub-city which has 12 Woredas due to time limitations.

CHAPTER TWO: LITERATURE REVIEW

2.1 Malnutrition

According to WHO (2020), malnutrition refers to deficiencies, excesses or imbalances in intake of energy or nutrients. It covers under nutrition which includes stunting, wasting, underweight and micronutrient deficiencies or lack of important vitamins and minerals. Malnutrition also includes overweight and obesity. Globally, an estimated 41 million children under the age of five years are overweight, while some 159 million are stunted and 50 million are wasted (FAO et al, 2019). The various forms of malnutrition are intertwined throughout the life cycle, with maternal under nutrition, low birth weight and child stunting giving rise to increased risk of overweight later in life. Malnutrition affects all age groups across the entire life span from conception, throughout the fetal period and into early infancy, influence on growth, development, morbidity, and mortality (WHO,2000). In Ethiopia, household food insecurity, hunger and under nutrition remain critical issues; the poor nutritional status of women and children has been a consistent problem and, under nutrition is an underlying cause of 53%of infant and child deaths (USAID, 2014). Twenty-two percent of women of reproductive age are undernourished, leaving their children predisposed to low birth weight, short stature, low resistance to infections, and high risk of disease and death (USAID, 2018).

2.2 Nutrition Statuses

Nutrition is a fundamental pillar of human life, health and development across the entire life span. From the earliest stages of fetal development, at birth, through infancy, childhood, adolescence, and on into adulthood and old age. Proper food and good nutrition are essential for survival, physical growth, mental development, performance and productivity, health and well-being (WHO, 2000). It is an essential foundation of human and national development.

Nutritional status is the description of information obtained from the method of nutritional assessment. The information obtained is used to determine the health and nutrition status of individuals or groups of population as these are influenced by their intake and utilization of nutrients by the body. Body needs three major classes of nutrients, i.e. carbohydrates, proteins and fats. These supply the energy and the building blocks that are needed to synthesize cellular

components. The body also needs micronutrients, especially vitamins and minerals, because they are necessary for optimum cellular metabolism. Nutritional status can be assessed by direct or indirect methods. Indirect methods use clinical, biochemical or dietary assessment. The direct method involves anthropometric assessment (WHO, 2000).

2.2.1 Anthropometric Indicators

According to Cogill (2003), Weight-for-age, Length-for-age, or Height-for-age, Weight-for-length or Weight-for-height are the three indices that are commonly used in assessing the nutritional status of children.

Weight-for-Height (W/H)

Weight-for-height is normally used as an indicator of current nutritional status, and can be useful for screening children at risk and for measuring short term changes in nutritional status. Low W/H relative to a child of the same sex and age in a reference population is referred to as thinness. Extreme cases of low W/H are commonly referred to as wasting. Wasting may be the consequence of starvation or severe disease (in particular diarrhea), but it can also be due to chronic conditions (WHO, 2006). Low weight-for-height helps to identify children suffering from current or acute undernutrition or wasting and is useful when exact ages are difficult to determine. Weight-for-height (in children over 2 years of age) is appropriate for examining short-term effects such as seasonal changes in food supply or short-term nutritional stress brought about by illness (Cogill, 2003).

Weight-for-Age

Weight-for-age (W/A) reflects body mass relative to age. W/A is, a composite measure of height-for-age and weight-for-height, making interpretation difficult. Low W/A relative to a child of the same sex and age in the reference population is referred to as lightness, while the term underweight‖ is commonly used to refer to severe or pathological deficits in W/A. W/A is commonly used for monitoring growth and to assess changes in the magnitude of malnutrition over time. However, W/A can show the effects of short- and long-term health and nutrition

problems (WHO, 2006). The advantage of this index is that it reflects both past (chronic) and/or present (acute) undernutrition (although it is unable to distinguish between the two) (Cogill, 2003).

Height-for-Age

Height-for-age (H/A) reflects cumulative linear growth. H/A deficits indicate past or chronic inadequacies in nutrition and/or chronic or frequent illness, but cannot measure short-term changes in malnutrition. Low H/A relative to a child of the same sex and age in the reference population is referred to as shortness. Extreme cases of low H/A, where shortness is interpreted as pathological, is referred to as stunting. H/A is primarily used as a population indicator rather than for individual growth monitoring (WHO, 2006). Low height-for-age index identifies past undernutrition or chronic malnutrition. It cannot measure short term changes in malnutrition. For children below 2 years of age, the term is length-for-age; above 2 years of age, the index is referred to as height-for-age. Deficits in length-for-age or height-for-age is referred to as stunting (Cogill, 2003).

2.3. Diet Diversity

Dietary diversity is a qualitative measure of food consumption that reflects household access to a variety of foods, and is also a proxy for nutrient adequacy of the diet of individuals (Kennedy, 2013). Appropriately constructed indices of diversity in patterns of consumption reflect overall food adequacy at the household level, nutrient adequacy across members of the household, as well as an ability to avoid dietary monotony that may be associated with poor diet quality, and that such indicators offer an understanding of household food access. An in increase in dietary diversity is associated with dietary adequacy and caloric intake, socio-economic status and household food security (Coats et al, 2007). Diversity in diet carries the implication not only sufficiency in nutrient terms, but also of avoiding monotony.

The HDDS is an attractive proxy indicator for household food security and measuring nutritional outcomes for the following reasons (FAO, 2011).

i. A more diversified diet is an important outcome in and of itself.
ii. A more diversified diet is associated with a number of improved outcomes in areas such as birth weight, child anthropometric status, and improved hemoglobin concentrations.

iii. A more diversified diet is highly correlated with such factors as caloric and protein adequacy, percentage of protein from animal sources (high quality protein), and household income.

iv. Even in very poor households, increased food expenditure resulting from additional income is associated with increased quantity and quality of the diet.

Children are achieving minimum dietary diversity if they have consumed at least four food groups in the previous day out of the seven food groups (grain, root and tubers; legumes and nuts, dairy products, flesh foods, eggs, vitamin A rich fruits and vegetables, and other fruits and vegetables). Achieving the minimum dietary diversity of an infant or young child indicates micronutrient sufficiency (WHO, 2010).

2.3.1. Diet Diversity Score

Diet Diversity Score is differentiated as household dietary diversity score (HDDS) and individual dietary diversity score (IDDS), including child diversity score (CDDS) and women dietary score (WDDS). HDDS is a proxy measure of the household access to food, or the proxy measure of the socio-economic level of household, whereas the IDDS is a proxy measure of the nutritional quality of individual's diets, particularly that of micronutrient adequacy of a diet. A qualitative measure of household-access to a variety of foodstuffs is an indicator of adequate nutrient intake or a valid measure of nutritional adequacy. There is some evidence indicating that DDS and nutritional status can both correlate or interact (Krawinkel, 2016). The household dietary diversity score has been shown to be a valid proxy indicator of the economic ability of a household to access a variety of foods (dietary energy availability of the household) (Hoddinot and Hatloy et al., 2000). At individual level, the dietary diversity score has been shown to be a valid proxy indicator of macronutrient and micronutrient adequacy of the diet for non-breastfed children (Hatloy et al., 1998, Steyn et al., 2006; Kennedy et al., 2007), adolescents and adults (Mirmiran et al., 2004; Foote et al., 2004, Arimond et al., 2010).

2.4. Home Garden

Home gardens are part of the agriculture and food production systems in many developing countries and are widely used as a remedy to alleviate hunger and malnutrition in the face of a global food crisis (Galhena et al, 2013). Household gardens contribute to at least eight of the Sustainable Development Goals of the United Nations (World vegetable Center, 2016). Home gardening has been effective strategy in increasing the production and consumption of micronutrient-rich plant foods and in increasing dietary diversity (Bhattacharjee et al, 2006). Home gardens can supply vitamin A, vitamin C, calcium, and iron requirement of the household (Weerahewa et al., 2011). Globally, home gardens have been documented as an important supplemental source contributing to food and nutritional security and livelihoods and very good strategies to address the challenges of micronutrient malnutrition through the production of micronutrient rich foods, and improve diet diversification (FAO, 2011; Faber and Laurie, 2014).

2.5. Home Garden in Ethiopia

In Ethiopian, households have practiced homestead gardening for centuries, but under-consumption of healthy fruits and vegetables. This is because most small-scale backyard production have traditionally focused on calorie rich but nutrition poor crops such as maize, Enset (false banana) or stimulants such as coffee or "Chat". To increase the availability of fruits and vegetables, the government of Ethiopia is promoting home gardens at a large scale across the country. Since 2016, Ethiopia targeted 40% of rural households and 25% of urban households for homestead gardens by 2020 (Hirvonen and Headey, 2020). And, only about 15% of the households operated a garden where they grew fruits or vegetables. Limited access to water was the main constraint and a small number of households reported lack of time, skills and inputs as reasons why they hadn't adopted a homestead garden. Interestingly, research also found that households located closer to a good market were more likely to adopt home gardening. This suggests that producing fruit and vegetables offers a valuable access to cash-income. While there's potentially an income-nutrition trade-off at the household level, one could argue that more fruits and vegetables in local food markets is good for the community as a whole (Hirvonen and Headey, 2020).

2.5.1 Home Garden in the Urban and Peri-urban Agriculture sector in Addis Ababa

Urban and peri-Urban Agriculture (UPA) plays an important role in Addis Ababa's economy, food and livelihood systems. Broadly speaking, Urban agriculture in the city involves livestock keeping, predominantly dairy cows, sheep and chickens; egg production and the cultivation of rained and irrigated crops, mainly vegetables but also cereals and pulses, on land adjacent to homes, river banks, on school and hospital land and in open fields (Gebremichael et al, 2014). The UPA sector in Addis Ababa comprises individual farmers as well as farmers organized in micro-enterprises and cooperatives. According to a Central Statistical Authority (CSA) report (2007), 30 per cent of vegetables including 60–70 per cent of leafy vegetables, 60–70 per cent of milk and 40–60 per cent of eggs consumed in the city are supplied by Urban and peri-urban and Agriculture producer.

Urban farming takes place in all Addis Ababa's 10 sub-cities. According to estimates from the Addis Ababa Urban Agriculture Office, vegetables are produced on more than 300 ha; there are 6 454 vegetable producers. According to Gebremichael et al (2014) the urban vegetable producers use a combination of mineral fertilizer, compost and manure to improve the fertility of their land. And, reported that vegetable growers had good access to extension support and that engagement in UPA increased their food security. The major constraints expressed by the farmers were a shortage of labor, pests, and insecurity of land holdings. UPA provides a critical source of fresh, nutrient dense foods for the city's food basket, and is an important livelihood resource for those engaged in UPA.

UA is important but untapped economic sector in Ethiopia, it can contribute for employment and economic development (Amsalu, 2020). However, although UPA is beginning to garner recognition within Ethiopia's community, the existing policy and legislative frameworks do not encourage it sufficiently (Gebremichael et al, 2014). UPA was not included in the 2010–2014 Growth and Transformation Plan (GTP), which was designed to support agriculture in playing a lead role in the growth and development of Ethiopia's economy. Indeed, the sector faces many problems that require policy support, including availability of land and security of tenure; access to clean water for irrigation; adequate supplies of inputs and credit services; weak farm organizations; low productivity, and long marketing chains.

2.6 The Role of Home Garden on Nutrition, Food security and Economic benefits

Home garden provides food and nutritional security, improving family health and human capacity, empowering women, promoting social justice and equity, and preserving indigenous knowledge and culture. Home garden contributes to household food security by increasing availability, accessibility and utilization of food products. And, home gardens are established for easy access to fresh plant and animal food sources in both rural and urban areas (Mitchell and Hanstad, 2004).

According to FAO (2010), gardening can enhance food security through: 1) direct access to a diversity of nutritionally-rich foods, 2) increased purchasing power from savings on food bills and income from sales of garden products, and 3) fallback food provision during seasonal lean periods. The contribution of home gardens not only for increased household food but they also reduce household expenditure and create employment (Bongiwa and Obi, 2015, Rammohan, et al, 2019). Income from a home garden can be used to purchase food items that the family cannot produce, thus adding variety to meals and supplementing production. Home garden income can pay for daily essentials and services, such as soap, clothes, school fees, medicines and farm inputs that cannot be produced by the household (FAO, 2010). Besides to the economic benefits, food and nutritional security, home gardens can contribute to income generation, improved livelihoods, and household economic welfare as well as promoting entrepreneurship and rural development for resource-poor families (Trinh, et al., 2003; FAO, 2010; Calvet-Mir, et al., 2012).

Enset and coffee based home gardens is an integrated farming system that is not only provided subsistence and complementary food products for Ethiopian families but also provided the primary means of employment for the household (Tesfaye, et al., 2006). Faber et. al. (2002) conducted a study in a rural village in Kwa Zulu-Natal in South Africa and found that production of yellow and dark green leafy vegetable in home gardens significantly improved Vitamin A status of children between the ages of two to five years. This project showed that home gardens can play a significant role in improving the dietary intake of food items rich in Vitamin A.

A study in south Africa showed that households who obtained fruits from their home garden showed a significantly higher consumption frequency (5.2 days per week) than households who acquired them from elsewhere who had consumption frequency of 3.6 days per week (Beushausen, et al, 2020). Home garden production accounted for 15% of the households´ dietary diversity and

considerable source for dark green leafy vegetables. A study conducted in Sri Lanka (Thamilini et al, 2019) showed that household food security was not significantly associated with home gardens. However, improved home gardens provided diets with a greater contribution of energy, carbohydrates, fat, calcium, iron, zinc, folate, thiamin, niacin, vitamin C, and vitamin A compared with non-organized home garden. The study also demonstrated that households with organized home garden had greater dietary diversity from home garden produce compared with that of households with non-organized home garden leading to better food and micronutrient intake and nutritional security.

The other study showed that household dietary diversity (HDDS) is positively associated with the presence of home gardens in the household. And the short term nutritional status measured by weight-for-age z-scores (WAZ) of children in the ages 0 to 5 is negatively related to household dietary diversity, while the presence of a home garden positively affects the long term nutritional status measured by height-for-age z-scores (HAZ) (Chauhan, 2015). Studies from Nepal, Cambodia, and Papua New Guinea reported that the income generated from the sale of home gardens fruits, and vegetables allowed households to purchase additional food items as well as for savings, education, and other services (Iannotti et al., 2009). Mitchell and Hanstad (2004) describes that home gardens can contribute to household economic wellbeing in several ways. Home gardens products may be sold to earn additional income. Furthermore, the direct earnings from the sale of home garden products and the savings from consuming home grown food products can lead to more disposal income that can be used for other domestic purposes. A study conducted in Nigeria on the contribution of home gardening to family food security revealed that home gardening contributes to the household food supply and to generate market income (Uzokwe, Giweze, and Ofuoku, 2016).

Other scholars have conducted research to understand the impact of home garden to home nutrition improvement for example (Selepe, 2010; Rammohan et al, 2019; Bongawi &Obi, 2015; Pradhan et al, 2018; Galhena et al, 2013). Impact evaluation of home gardening showed that although the gardens did not make a major contribution to food consumption and nutrition, they were instrumental in improving the women's income and social status as well as their awareness of evolving food habits in urban areas (Galhena et al, 2013). Other study on the impact of home garden on diet diversity, nutrient intake, and nutritional statues of pre-school children in South

Africa showed that home gardens have direct positive impact on dietary diversity improvement for children. Dietary diversity and the frequency of consumption of nutritious foods increased with the implementation of the gardens and, access to food improved, with the consumption of produce from the garden having a direct impact on the consumption of foods by the children, particularly the nutrient-rich foods grown in the gardens (Selepe, 2010). Similar study also found that nutrient intake (Vitamin A and iron) by children increased after growing vegetables in the gardens (Swiss chard, beans, carrots, cabbage and beetroot). Home gardens have been found to improve food security and dietary diversity in a wide range of settings. There are significant associations between access to home gardens and measures of food security and improved dietary diversity (Rammohan et al, 2019). In addition, Bongawi & Obi (2015) argued that home gardening enhanced household food security through direct access to nutritionally-rich fresh vegetables and improving income. A study conducted in India on introduction of nutrition garden to address household diet diversity showed that monthly per capita consumption of fruits and vegetables, both quantities consumed and frequency of consumption increased between baseline and end line. And, increased availability of different groups of vegetables also fulfilled the household nutritional requirement (Pradhan et al, 2018).

A study conducted in Ethiopia, on the contribution of Urban Agriculture on household food security revealed that Urban Agriculture contributed to improved income; food availability; provide direct access to diverse nutritionally rich vegetable and fruit (Endale, 2011; Sophia, 2015; Teferi, 2015). The other study reported that well established home-gardens improve income and the status of food security (Habitamu, 2008). However, all these studies assess the availability and access component using descriptive statistics without examining the impact of home garden to nutrition improvement by using anthropometric measurement.

CHAPTER THREE: RESEARCH DESIGN AND METHODS

3.1 Description of the study area

Nifasilk Lafto Sub City is one of the 11 Sub Cities in Addis Ababa City Administration. Nifas Silk Lafto Sub City is situated to the South-East of Addis Ababa. Its boundaries are Ormia regional state rural kebeles from the South, Akaki Kality Sub City from the East, Kolfe Sub City from the West and Lideta Sub City from the North. Lebu (Woreda 01) is among the twelve woredas in Nifa Silk Lafto Sub City situated to the Southern part of the sub city. According to the 2014-2017 population projection (CSA, 2013), Nifas Silk/Lafto Sub City has the population of 396, 486 (47% female, 53% male). The Sub City is divided in to 12 Woreda, and each woreda has its own administration.

The Sub City is divided in to twelve 12 Woredas. And, according to the Sub City Agriculture Extension core process leader and horticulture expert, three woredas (woreda 01, woreda 11, and woreda 12) have better potential in home garden production. Among these, Woreda 01 (Lebu) has better potential in terms of land and water availability and beneficiary participation as compared to other woredas. And, that was why this research was carried out in Woreda 01 of the Sub City. Target beneficiaries for this study was households who have been managing home garden for home consumption purpose. In the woreda there are about 545 households who established home garden in the Woreda.

The Urban agriculture interventions including home garden have been implemented in the Sub City. This has been done in line with Addis Ababa City Administration Urban and Pre-Urban Agriculture policy and strategy with the aim to reduce poverty, improve accessibility of vegetables and improve nutritional status of the community (AACA, 2013). In the policy document, vegetable growing has been taken as a top priority intervention to be implemented in the home garden, communal open space and along the river banks. The Urban Agriculture development strategy of the Country (FDRE, 2019), shows that Urban Agriculture interventions including vegetable gardens has the potential to improve food security, income, household nutrition and create job opportunities for the poor households in the City. According to AA city administration urban agriculture office, in all the sub cities and woredas, vegetable production is taken as better intervention for improving household consumption and job creation.

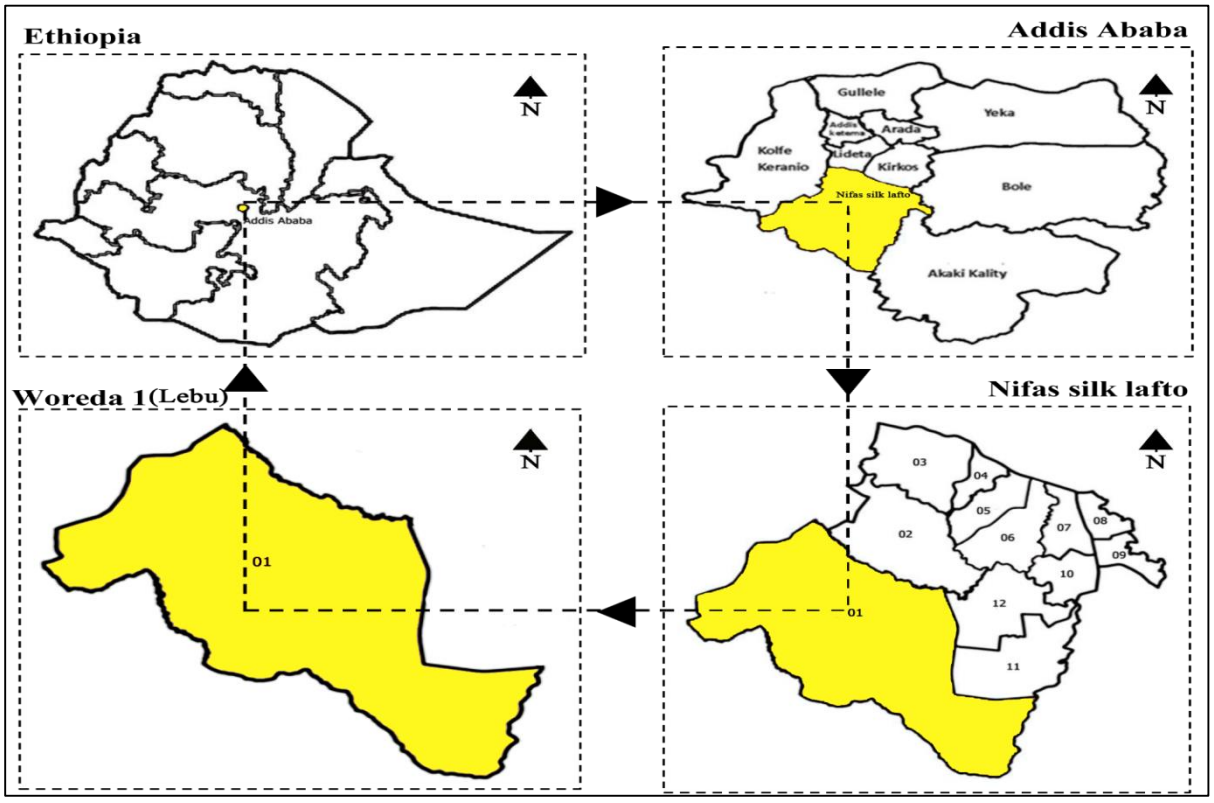

Figure 2. Map of the study area:

Source: Own construction from GIS data

3.2 Study period

The study was conducted in May and June 2021 in Addis Ababa City Administration, Nifasilk Lafto Sub City, Woreda 01.

3.3 Sampling Procedures and Sample Size Determination

3.3.1 Site Selection Procedure

Site selection was done purposely because of availability of data in the study area. At the initial stage of this research, discussion was made with Addis Ababa Urban City Urban Agriculture office horticulture expert about the availability of home garden beneficiaries. The information gained from the discussion shows that Nifa Silk Lafto Sub City has better potential in terms of the size of

home garden beneficiaries in the City. And Lebu, is found with higher number of beneficiaries who engaged on home garden for household consumption purpose. The data obtained from the woreda farmers and urban agriculture office shows there are 545 households engaged on home garden.

3.3.2 Sample Size Determination

Sample size for the study determined using Yamane (1967) formula.

$$n = \frac{N}{1 + N(e)^2}$$

n= required sample size

e = precision error

N= total population

Therefore, the sample size for the study was n= $545/1+545(0.05)^2 = 230$. In order to evaluate the role of home garden to child nutrition and home diet diversity, equal number interviewee taken from home garden owners and non-home garden; so 115 participants were from home garden beneficiaries whereas the remaining 115 from non-home garden households. Respondents from home garden were randomly selected from home garden beneficiary list obtained from Lebu Woreda urban agriculture office. Whereas, respondents from non-home garden households where contacted and interviewed from the same woreda.

3.4 Data Collection Procedures

The methodology for this study included both the quantitative and qualitative components based on the household survey, focus group discussion, and KII. And, mix of close ended and open ended semi structured data collection instruments developed and pretested to ensures validity of the instrument. Pre-test was made and, the pre-tested data were not included as part of the main data of the study. The data collections were facilitated by two enumerators who have nutrition science and agriculture back ground. And, through the discussions, Lebu Health Center Nutrition Unit was optimistic to support the anthropometric measurement. One-day training was given to data enumerators on the objectives of the study, on the contents of the questionnaire, on the methodology of the study, on the issues of the confidentiality of the responses, on the use of

instruments and on the procedures how to take anthropometric measurement. All measurements were carried out using standard procedures. The home garden household data was taken through the household survey at the household level at the home garden site. But, the data from households who had no home garden was taken in collaboration with the Lebu health center nutrition unit, and their data collected at the health center by the nutrition experts while household came for regular nutrition statues check of their under five children.

Key Informants were drawn from different sector office (Sub City and woreda urban agriculture, health and nutrition, City Administration Urban Agriculture). In addition, two FGDs were conducted, participants were home garden beneficiaries who weren't participate on the household survey. Different secondary data sources reviewed (reports, relevant research findings, manuals, project documents). And, field observation and records incorporated in this report.

3.5 Anthropometric Measurements

The anthropometric measurement was applied to measure weight, height, and age for children below five years of children, to determine underweight, stunting and wasting, according to Cogill (2003).

Age: the age of children was collected from the mother/caretakers and they were able to tell the exact age of their children. The age of the children < 5 years was recoded in months. No mother or caregiver had confusion in providing proper data related to age of their child.

Sex: Was recorded as male and female.

Height: For children > 2 year was measured using length measuring board in the standing up position while the child was barefooted and free of head wearing in children in standing-up position, measured to the nearest 0.1 cm. And, Length/height boards was used to measure children under 2 years of age lying down (recumbent) position.

Weight: weight was measured using a 25 kg measuring scale graduated by 100 gm for children and was recorded to the nearest 0.1 kg. The scale was calibrated immediately before and during each session by placing standard calibration weights of 5 kg iron on the scale to ensure accuracy.

Using the anthropometric measurement, the following three indices were measured and computed for the home garden household's respondents and non-home garden households, according to Cogill (2003).

Indices measured by the anthropometric

Index	**Nutritional problem measured**
Weight for height	Acute malnutrition (wasting)
Height for age	Chronic malnutrition (Stunting)
Weight for age	Underweight

3.6 Households Food Insecurity Access scale

Household Food Insecurity Access Scale Generic Questions used to distinguish the food secure from the insecure households. These questions represent apparently universal domains of the household food insecurity (access) experience and can be used to assign households and populations along a continuum of severity, from food secure to severely food insecure. The Household Food Insecurity Access was measured using a set nine questions related to three different domains of food insecurity access: (i) anxiety and uncertainty about the household food supply; (ii) insufficient quality in terms of variety and preferences of the type of food and (iii) insufficient food intake in terms of reducing quantity of food. The respondents were asked to know whether a given condition was experienced in the 30 days or not. If that condition happened the frequency of occurrence recorded as rarely, sometimes, or often. Each of the nine questions were given score from 0-3, with 3 being the highest frequency of occurrence. And, based on the responses given to the nine questions and frequency of occurrence over the past 30 days, households were assigned a score that ranges from 0 to 27. A higher HFIAS score is indicative of poorer access to food and greater household food insecurity. The lower the score, the most food secured a household. Food security status of households as food secure, mildly food insecure and moderately food insecure was determined according to (Coates et al, 2007). A food secure household experiences none of the food insecurity (access) conditions, or just experiences worry, but rarely.

A mildly food insecure (access) household worried about not having enough food ‘sometimes’ or ‘often’, and /or ‘rarely’ ate a monotonous diet or less preferred food. The household did not cut back on quantity nor experience any of the three most severe conditions, going for a whole day without eating, going to bed hungry or running out of food (Coates et al, 2007).

A moderately food insecure household sacrificed quality more frequently by eating a monotonous diet or less preferred food ‘sometimes’ or ‘often’, and /or had started to cut back on quantity by reducing size of meals or number of meals ‘rarely’ or ‘sometimes’ (Coates et al, 2007).

A severely food insecure household had deteriorated to cutting back meal size or number of meals ‘often’, and/or experienced any of the three most severe conditions, going a whole day without eating, going to bed hungry or running out of food, even as frequently as ‘rarely’. Any household experiencing one of these three conditions, even once in the past 30 days was considered as severely food insecure (Coates et al, 2007).

To administer the HFIAS questions the following two steps were implemented.

Step 1. Training was provided to interviewer and words or phrases was clearly discussed. In addition, terms were adapted to the local context and translated in to local language so that questions were easily understood by interviewers as indicated in Coates et al (2007).

Step 2. To ensure that the questionnaires are understood by the respondents, one respondent at a time was done. In addition, questions were administered in local language for ease of understanding by the interviewee.

3.7 Dietary Diversity Score

Household dietary diversity can be described as the number of food groups consumed by a household over a given reference period rather than the number of foods consumed (Anne and Bilinsky, 2006). Household dietary diversity is a proxy measure of household food access. The Household Dietary Diversity Score survey tool adapted from Food and Nutrition Technical Assistance III project.

DDS was Calculated on the basis of the number of food groups consumed within the 24 hours' recall period from the total of 12 food groups. The food group consumption frequency score (FGFS) was calculated by assigning a score of 0 if not consumed during the previous 24 hours, 1 if consumed. Each category was given a score of 1, so if the household consumed any of the cereals (wheat, rice, oats etc.), they were given a score of 1 and 0 if they did not, and so on for the other groups. HDDS indicator was collected by asking the respondent a series of yes or no questions and these questions were asked to the person who was responsible for food preparation, or to another adult who was present and ate in the household the previous day. Special occasions such as funeral, wedding and fasting were excluded, only normal circumstances considered. At the interview time, instructions given to respondents to consider food groups that were consumed by household members in the home in the previous 24 hours, or prepared in the home for consumption by household members outside the home (for example for lunch service out of home.) Foods consumed outside the home that were not prepared in the home were excluded.

3.8 Study Variables

The study has undertaken an assessment on the role of home garden on household dietary diversity and < 5 children statuses in the study area. Accordingly, home garden, diet diversity and children nutrition statuses were the variables for this study. The dependent and independent variables and their interrelationships was dealt by the study. Home garden was the main independent variables whereas the household dietary diversity and child nutritional statuses were dependent variables. Other independent variables were household income, knowledge, occupation statuses and their effect on the dependent variables; household diet diversity and child nutritional statuses was assessed by this study.

3.9 Data Quality management

The interview tool was pre-tested before actually administering the tool to the target population. Daily, all the questionnaires were checked for completeness at the end of the interview. A daily review meeting was made with data collectors to deal with any issues arising. And, close supervision and adequate guidance was provided to ensure quality data collection. Throughout

the research process, every care was done to maintain validity and data quality. Use of proper research design, taking enough sample from the population, use of appropriate data analysis techniques, interpretation and report writing were done properly.

3.10 Data Analysis and presentation

For the analysis of HFIAS, the response data was entered in to spreadsheet-excel. And, data was calculated manually using the below formula for each category. After the analysis, the food security status of households was categorized as food secure, mildly food insecure, moderately food insecure and severe food insecure, according to Coates (2007). The prevalence was calculated based on the distribution of response to the nine occurrence questions.

$$\frac{\text{Number of households with HFIA category}}{\text{Total number of households with a HFIA category}} \times 100$$

Anthropometric data was entered to WHO Anthro version 3.2.2 software package and analyzed accordingly. And, the result was presented in table using the specified cut off points (-2 Z-score) in relation to the reference population in terms of stunting, wasting, and being underweight. Regarding the HDDS, first, household level data was calculated considering the total number of food groups consumed by the members of the household. Value for A-L was considered as 0 or 1, according to Swindale and Bilinsky (2006). Second, the average HDDS was calculated as sum of HDDS divided by total number of households. A higher score reflects higher dietary diversity.

HDDS was calculated as the total number of food groups consumed by members of the household. Value 0 or 1 for all food groups from A to L. Sum = (A+B+C+D+E+F+G+H+I+J+K+l). And, average HDDS was calculated as the sum of HDDS divided by the total number of hhs

3. 11 Ethical consideration

After the approval of the proposal by the Addis Ababa university, support letter was secured from the AAU college of development studies. Nifas Silk Lafto Sub City informed about the objective

and purpose of the study through a support letter obtained from AAU. And, permission letter secured from Nifas Silk Lafto Sub City farmers and urban agriculture office, and this letter was submitted to Woreda 01 Farmers and Urban agriculture office and to Woreda 01 Health center for their cooperation for anthropometric measurement. Introduction of the study, method of the questioning and confidentiality letters was attached to the cover page of the questionnaires and explained to participants. The participants were informed that participation was on voluntary and they were allowed to participate or decline on the interview. And, information was collected anonymously, no names mentioned for those who were not interested. During the data collection, participants were informed about the objective and purpose of the study and oral consent obtained from each participant to collect data and anthropometric measurement. And Refusals were verifiable by using the "no" on consent forms.

CHAPTER FOUR- RESULT AND DISCUSSION

4.1 Results

4.1.1 Socio-economic Characteristics of Respondents

Accordingly, the collected data in table 1 below, showed that 65.2% and 34.8% home garden respondents were female and male respectively whereas 82.6% and 17.4% were female and male respectively for households who had no home garden. Age of respondents ranged from 21-70 years for both groups, the age of the majority of home garden household (66.9%) and 86.9% of households who had no home garden were below the age of 40 years. The data with regards to religion showed that 73.1% and 70.4% were Christian (orthodox-tewahido, catholic and protestant) whereas the rest 26.9% and 29.6% were Muslim respectively for home garden household respondents and non-home garden respondents. And, the marital statuses data showed that 74.8% and 94.8% married for home garden and non-home garden respondents respectively.

The educational level of home garden respondents was also assessed and the result showed that 14.7% were illiterate, 20% read and write, 16.4% from grade 1-4, 20% from grade 5-8, 18.2% from grade 9-12 and 12% having college diploma and above. In the same manner, the educational level of households who had no home garden showed that 35.6% of respondents had from 5-8 grade educational back ground, 32.1% from grade 9-12, 10.4% illiterate, 8.7% college diploma and above and the rest 6% were able to read and write.

The occupational data of respondents showed that most of the home garden households dwell their living engaging in the service sector, construction sector and guilt retailing of different items. The most majority (50.4%) were engaged on service sector activities including food and coffee service, environmental sanitation, cloth washing, guard in the informal sectors, shoe shining, loading and unloading, homemade and hiring for hotel and restaurant services. About 22 % of them engaged on guilt retailing of different item (vegetables, enjera and Kolo), and 10% of them were daily laborers in the informal construction sectors; they work masonry activities, painting, carpenters. Very few of the respondents were dependent on PSNP support were they received monthly

allowance and working on environmental sanitation and home garden activities. According to them, PSNP helped them to allocate for monthly saving from their monthly allowance and from the sale of vegetables they produced at group home garden. Home-garden was taken as apart-time work where they undertook it during their extra time at home. The rest small proportion engaged on agriculture and manufacturing sectors. In similar way, majority of the respondents of from non-home garden households (42.6%) were engaged on service sector activities, 22.6% engaged on small to large shop, 17.4% office work, 12% guilt retailing activities, 3.4% manufacturing sector (metal and wood work)

The income of respondents merely depended on the work they were carrying out. Baesd on the survey data the monthly income of home garden households showed that 8.6% of them getting birr 500-1000, 21.7% of them getting birr 1001-2000, 28.7% getting birr 2001-3000 and 28.7% of them was earning from birr 3000-4000 per month. Only few exception (12.1%) of them earning more than 5000-7000 birr per month. Regarding the income of non-home garden households, no household was found with income below 1000 birr/month, majority of them (41.7%) was earning from 4001-5000 birr/month, 26.9% of them had monthly income of birr 5000-12,000, 16.5% of the had monthly income of from 3001-4000 birr and the rest few had 1001-2000 income.

The survey data showed that the average family size for home garden households was 5 people whereas the average number of people in the household for non-home garden households was 3.5 member.

Table 1. Socio-economic and demographic statuses of respondents in Woreda 01, Nifas Silk Lafto

Variables	Category	Home garden hhs n=115	Non-home garden hhs n=115
Sex	Female	65.2%	82.6%
	male	34.8%	17.4%
Age	21-30	29.6%	60.0%
	31-40	37.4%	27.0%
	41-50	20.0%	4.3%
	51-60	7.8%	6.1%
	>61	5.2%	2.6%
Religion	Christian	73.0%	70.4%
	Muslim	27.0%	29.6%
	others		
Marital status	married	74.8%	94.8%
	single	13.0%	
	divorced	6.9%	
	separated	1.8%	
	widow	3.5%	5.2%
Education	Illiterate	14.8%	10.4%
	read and write	20.0%	6.1%
	1- 4grade	16.5%	7.0%
	5-8grade	20.0%	35.7%
	9-12 grade	18.3%	32.2%
	college	10.4%	8.7%
Occupation	Office work	8.7%	17.4%
	small shop	12.2%	22.6%
	Guilt retailer	20.9%	12.2%
	Service	50.4%	42.6%
	agriculture	0.9%	
	manufacturing	0.9%	3.5%
	construction	6.1%	1.7%
Monthly income	501-1000	8.7%	
	1001-2000	21.7%	5.2%
	2001-3000	28.7%	9.6%
	3001-4000	20.0%	16.5%
	4001-5000	8.7%	41.7%
	>5000	12.2%	27.0%
Average family size		5.16	3.58
Average <5 children in hhs		0.77	0.97

Source: researcher own findings

4.1.2 Characteristics of Home Garden in the Study Woreda

Respondent told that they started home gardens with support from Government and PSNP, only few of them started by their own initiation. According to the respondent, they started home garden for producing year round availability of vegetables for home consumption and sell extra produces. Of course, very few of them added that home garden provided them social benefits by creating jobs for them, especially for women. So, most of them spend their rest time in managing their garden. Home gardens were managed by the family labor, both the husband and the wife, were responsible to manage the garden. According to the respondent, however, there were activities that need special management by the husband and the wife (women). Land preparations, and planting was done by the husband and cutting and using the produce and selling of extra vegetable produce was the responsibility of the wife.

Gardens were established in the home compound and in the river sides, based on open space availability. The size of the gardens varies from 12 square meter up to 300-meter square, depending the availability of space. The largest home garden observed in *kersa* site where dwellers were growing different vegetables using irrigation, they are semi farmers in the woreda. one farmer was interviewed as part of the study sample because representing other farmers who were residing under the study woreda. Woreda farmers and urban agriculture office and PSNP program provided with seed supplies, trainings and technical support. In addition, few of the respondents got un-utilized open area in the river sides. Based on the government budget year, home gardens started every June and continuing to produce throughout the year depending on the availability of water source. The location of home garden was in the home compound and in the riversides. The most majority (63%) of the respondents have been managing their garden in their home compound. and 37% in the river side and farm level. Table 2, below, showed the home garden size in the study area.

Table 2. The surface area of the home garden in meter square

Home garden size in meter square	% of home garden
12--30	24.3
31--59	28.7
60--90	23.4
91--120	16.5
> 121	6.9

Source: researchers own findings

Water was one of the constraint mentioned by the most majority of the respondents. Most of them who had home garden in their home compound using tap water for growing vegetable in their garden. Other used river water for their garden however, they complained about water pollution and sanitation problem because the river water was full of dirt and poisonous and risky for their life. To reduce the risk associated with the river water, they were watering their garden early in the morning. Whereas at the home compound, respondents told that they watered their garden in most of the days in a week when the water available however, water shortage was frequently happening in the woreda.

4.1.2.1 Crop diversity

The data related to the diversity of production in the home garden showed that there was uniformity across the gardens. Almost all the garden in the sample households were growing leafy vegetables and tuber crop including Kale, Swiss-chard, Lettuce, Cabbage, Beet root, Carrot, Potato, Tomato, and fruits (apple). Kale, Swiss-chard, Lettuce, Cabbage were mostly observed whereas potato and tomato were observed in few gardens and fruit (apple) observed in one garden. Most of the respondents (about 52%) were growing two types of varieties of vegetables; Kale and Swiss Chard. Whereas diversified varieties were observed in large home garden areas and farmers field. Production in the home garden depended on the household knowledge, preferences and seed availabilities in the market and gift from the government. Consumption and food preparation from garden produce guided by what they produced in their garden. Garden offers with clean and fresh

produce for home consumption and they sell to retailers in case they need to earn money to spend for other purposes.

4.1.2.2 Training and information

Though training is important for the production and utilization of home garden produces, the most majority of home garden household respondents got training. The most majority (60%) of them got trainings on soil preparation – including bed making, garden management, and utilization. Few of them responded that orientation and technical support was given to them by the woreda farmers and urban Agriculture experts. According to them Orientation was during the first round seed provision whereas technical support was given in the monitoring visit.

Table 3. Training Statuses of respondents in Woreda 01, Nifa Silk Lafto

Capacity building activities	Unit	No. of HHs
HHs received training on nutrition information and agronomic practices	HHs	60%
HHs received Orientation	HHs	53%
HHs received technical support	HHs	73%

Source: Researchers own findings

4.1.2.3 Statuses of the Home Gardens

From the field data, the statuses of home garden vary based on the management activities of home gardeners. Composting, watering, and weeding was not properly done, even utilization of matured vegetables at the right age was not possible for few respondents. The observation result showed that there was no regular water even when water was available. Weed management, pest control and soil management was poorly managed in most observed gardens. The dense populated plant size and narrow spacing was the other problem observed from the gardens. According to the respondents, they preferred long live vegetables like Kale and Swiss chard because it needs little management, survives in water stress condition and stays long time on the plot.

The soil type observed was black clay-textured soil type that has the characteristics of cracking in the dry season and holding much water in the rainy seasons. This coupled with the poor management practices for garden reduces the growth of vegetables and contributes to low garden

yield. The factors affecting pertaining to the management of home garden showed that lack of attention, time constraints, water shortage, lack of knowledge, home garden was not given much attention as an important source of food and income.

4.1.2.4 Use of Home Garden Produces

The survey result showed that home garden owners prepare vegetable at home up to four days in a week as compared to those who have no home garden who prepared one-two days in a week. According to both groups, however, there is variation during the fasting and normal occasions. Most Christians (Orthodox Tewahido), who were the majority of the respondents told they prepared vegetables at most of the days during the fasting time. Respondents were asked the question that said 'did you sell vegetables from own garden?'. And, 57% of the respondent responded 'yes'. They sold vegetables to earn market income from the sell. Most of the income from the sale was used to purchase food items, for transport, for purchase of cosmetics/lubricants. The food items purchased by the sale of vegetables were bread, sugar, coffee & tea, oil, flour and biscuits. Few respondents reflected that they sold vegetables because they did not have cooking oil for preparing vegetables food. It was not possible for most of them to purchase cooking oil. So, they sold vegetable and instead they purchase potato tuber and cooked it and consumed without requiring oil.

4.1.3 Household Food Insecurity Statuses

The household food security access of the community was assessed using the Household Food Insecurity Access Scale (HFIAS). The information gathered from the HFIAS was used to assess prevalence of household food insecurity of households. The HFIAS tool consists of two types of questions; the nine occurrences and nine frequency of occurrence questions. And, each of these questions were administered with a recall period of four weeks (30 days), according to Coats et al (2007). HFIAS data was recorded for both home garden household and non-home garden household who involved in the interview. And the result was presented as follows. The below table shows the food security statuses of respondents.

mTable 4. Household food security statuses of respondents in Woreda 01, Nifa Silk Lafto

HFIAS Questions	Home garden					Non-HG				
	Occurrence		Frequency			Occurrence		Frequency		
	Yes	No	Rarely	Some times	Often	Yes	No	Rarely	some times	Often
In the past four weeks, did you worry that your household would not have enough food?	89	26	55	17	7	85	30	62	18	5
In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources	87	28	56	27	4	86	29	63	20	3
In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources?	86	29	68	15	3	81	34	63	14	4
In the past four weeks, did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?	78	37	61	12	5	72	43	57	13	2
In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	19	96	15	4	0	16	99	12	4	
In the past four weeks, did you or any other household member have to eat fewer meals in a day because there was not enough food?	13	102	13		0	9	106	9		0
In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food?	9	106	6	3	0	5	110	5		0
In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food?	6	109	6	0	0	3	112	3		0
In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food?	0	115	0	0	0	0	115	0	0	0

Source: researchers own findings

The below table depicts the distribution of “yes” response to the Household Food Insecurity Access Scale (HFIAS nine occurrence and three frequency questions which showed the food insecurity situation of respondents in the study area.

Table 5. Distribution of ‘’ Yes’’ Response in the HFIAS in Woreda 01, Nifas Silk Lafto

Distribution of "Yes" response in %

HFIAS Questions	Home garden				non home garden			
	Yes	**Rarely**	**some times**	**Often**	**yes**	**Rarely**	**Some times**	**often**
Domain: Anxiety and uncertainty								
In the past four weeks, did you worry that your household would not have enough food?	77.3	56.5	14.8	6	73.9	53.9	15.6	04.3
Domain: insufficient quality								
In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources	75.6	48.7	23.4	3.5	74.8	54.9	17.4	2.6
In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources?	74.7	59.1	13	2.6	70.4	54.9	12.17	3.5
In the past four weeks, did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?	67.7	53	10.4	4.3	62.6	49.6	11.3	1.7
Domain: Insufficient quantity								
In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	16.52	13.04	3.48	0	13.91	10.43	3.48	0
In the past four weeks, did you or any other household member have to eat fewer meals in a day because there was not enough food?	11.30	13.30		0	7.83	7.83	0	0
In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food?	7.83	5.22	2.61		4.35	4.35		

In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food?	5.22	5.22			2.61	2.61		
In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food?	0	0	0	0	0	0	0	0

Sources: Researchers own findings

Table 5, above, showed the score distribution in the nine occurrence questions. And, the result showed that the responses to the HFIAS items were generally consistent. There was a decreasing percentage in the affirmative responses from the first question to the last question. This indicated that the severity of household food insecure was getting lower over the domain. More respondents reported affirmatively to the items indicating less severe food insecurity such as they have to eat a limited variety of foods due to the lack of resources, than go a whole day and night without eating anything. The highest "yes" was found for question number one "in the past four weeks, did you worry that your household would not have enough food?" by both groups, 77.3% and 73.9% respectively by home garden respondents and non-home garden respondents. And the least "yes" response was responded for question number eight "in the past four weeks, in the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food? which is 5.2% and 2.6% for home garden respondent's beneficiaries and for non-respondents respectively.

The above table depicted that the non-home garden respondents were positioned on better food security statuses than home garden respondents. It might be for different reasons. Sample for non-home garden respondents were selected randomly from the Lebu health center who come to follow their children statues in the nutrition unit. On the other hand, the Addis Ababa City Administration farmers and urban agriculture office has been promoting urban agriculture targeting on the poor household. Being the poor was used as home gardening selection criteria by the woreda farmers and urban agriculture office. So, the difference in food security statuses of respondents might be due to the socio economic variation of home garden respondents and non-home garden respondents. However, those who were engaged on home garden had responded that they able sell garden produces to the market apart what they were consuming. And, from the market income they could able to purchase food items and nonfood items, and improve their livelihoods. A majority of the home gardeners indicated the positive impact of home gardens in terms of improving food

availability, access and utilization as compared to their previous statuses. In addition, home garden beneficiaries responded that they got social and economic benefits as the result of they started home garden. Most of the home garden beneficiaries responded that they got job for their extra time and spending in their garden management they created them joy and happiness apart from the economic benefits they generated from the direct vegetable growing.

Table 6. The prevalence of household food insecurity statuses of respondents in Woreda 01

	Food insecurity prevalence (%)	
Food Insecurity Category	**Home garden HHs**	**Non home garden HHs**
Food Secure	43.47	45.27
Mildly food insecure	33.91	36.52
Moderately food insecure	14.78	13.09
Severely food insecure	7.83	4.35

Source: Researchers own findings

The table 6, above, showed the general food insecurity prevalence of respondents. Based on the research result 43.47% and 45.27% of respondents respectively in home garden and non-home garden households were food secure. And, 33.91% and 36.52% households in home garden and non-home garden households were respectively mildly food insecure. And, 14.78% and 13.09% were moderately food insecure in home garden and non-home garden households. The remaining small number of households (7.83% vs 4.35%) were food insecure for home garden and non-home garden households respectively.

4.1.4 Household Dietary Diversity

Dietary diversity score was determined by counting the number of food groups consumed by a household or individuals over the last 24 hours, as indicated in the questionnaire. Each participant was required to list all foods and drinks consumed on the previous day without quantifying them. An item consumed from a specific food group was counted only once and DDS of < 4 represents poor diversity, according to Krawinkel (2016). And, an increase in the average number of different food groups consumed provides a quantifiable measure of improved household food access, according to Swindale and Bilinsky (2006). With this assumption in mind the household diet diversity was assessed and compared between the two groups (households having home garden vs with no home garden) as follows. The below table 7 showed the HHDS of the two groups.

Table 7. Household diet diversity of respondents in Woreda 01, Nifa Silk Lafto

Food Groups	HDDS for HG hhs n=115	HDDS for NHG hhs n= 115
Cereals	115	115
Roots and tubers	58	61
Vegetables	77	48
Fruits	19	25
Meat/Poultry	19	14
Eggs	30	13
Fish	1	0
Legumes	97	84
Milk and Milk products	48	42
Oil and fats	77	85
Sugary foods	35	56
Any other foods	66	62
Total	642	605
Average HDDS	5.58	5.26

Source: Researchers own findings

First the number of food groups consumed by each respondent households was checked and tabulated in the spreadsheet-excel. And, the number of food groups consumed by each HH was known. In order to get, the average DDS, the number of food groups consumed by the each HH summed up and divided to the total Number of HHs. As shown in the above table the average HDDS for home garden households and non-home garden households was 5.58 and 5.26 respectively. And the number of food groups consumed by the HHs who owned garden households and non-home garden households ranged from 2-8, there was no difference. However, even though the number of food groups consumed in both groups seem more than the recommended 4 food groups, the consumption of animal source food (meat /poultry, eggs and fish) was low for both groups of households through very small difference was observed. The consumption of meat, eggs, and fish for home garden households was 16.5%, 26% and 0.86% respectively. And, it was 12.17%, 11.30% and 0% respectively for non-home garden households. Legumes, oil and fats, sugar and other food like coffee and tea were responded by most of the HHs in both groups. Most households from home garden owner group responded the inclusion of vegetable in their diet, in the 24 hours' recall, compared to those who have no home garden, 66.9% and 41% respectively. All the respondents (100%) from both groups consumed cereals in the past 24hours recall.

4.1.5 Anthropometric Assessment

Prevalence of general stunting was 31.46% and 33.33% for children < 5 years in the home garden and non-home garden households respectively. The total prevalence of stunting was higher for girls than boys in both group of households, that was 43.58% for home garden household and 33.33% for in non- home garden households. Similarly, moderate stunting prevalence of girls was 43.58% and 29.63% respectively in home garden and non-home garden households which was higher than boys who had 20% and 8.82% in home garden and non-home garden households. Whereas severe stunting was higher for boys in both group of households than girls 2% vs 0% and 20.58% vs 3.70 in home garden and non-home garden households respectively. The below table shows the prevalence of stunting by sex.

Table 8a. Prevalence of stunting by sex of respondents in Woreda 01, Nifas Silk Lafto

	< 5 Children in HG hhs			< 5 Children in NHG hhs		
	All n= 89	Boys n = 50	Girls n= 39	All n=112	Boys n= 68	girls n= 54
Prevalence of total stunting (<-2 z-score)	(28) 31.46%	(11) 22%	(17) 43.58%	(38) 33.9%	(20) 29.41%	(18) 33.33%
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score	(27) 30.33%	(10) 20%	(17) 43.58%	(22) 19. 64%	(6) 8.82%	(16) 29.63%
Prevalence of severe stunting (<-3 z-score	(1) 1.12%	(1) 2%	0	(16) 14.28%	(14) 20.58%	(2) 3.70%

Source: Researchers own finding

The prevalence of total, moderate and severe wasting, as measured by weight-for-height in all under-five children in home garden households was 13.4%, 12.3% and 1.12% respectively as compared to the higher prevalence of wasting in non-home garden households that had 16.07%, and 6.25% respectively for total and severe wasting. And, moderate wasting was higher in home garden households (12.3% vs 9.28%) respectively in home garden and non-home garden households. In general, boy had higher total and moderate wasting prevalence in home garden households (18% and 16%) than non-home garden households who had 11.76% and 7.37% respectively for the total and moderate wasting. The below table shows the prevalence of wasting in both group of households.

Table 8b. Prevalence of wasting by sex of respondents in Woreda 01, Nifa Silk Lafto

	< 5 Children in HG hhs			< 5 Children in NHG hhs		
	All n= 89	Boys n = 50	Girls n= 39	All n=112	Boys n= 68	girls n= 54
Prevalence of total wasting (<-2 z-score)	(12) 13.4%	(9) 18%	(3) 7.69%	(18) 16.07%	(8) 11.76%	(10) 18.5%
Prevalence of moderate wasting (<-2 z-score and >=-3 z-score	(11) 12.3%	(8) 16%	(3) 7.69%	(11) 9.82%	(5) 7.35%	(6) 11.11%
Prevalence of severe wasting (<-3 z-score	(1) 1.12%	(1) 2%	0	(7) 6.25%	(4) 5.88	(3) 5.55%

Source: researcher own findings

Though the total prevalence level of underweight as assessed by weight-for-age measurements was very much lower than the national averrage (24%), < five children in home garden households had higher underwieght than in non homegarden households (6.74% vs 4.46%). And, Prevalence of moderate and severe underweight was 3.37% and 2.94%, respectively respectively in homegarden and non home garden households. The table beow reflects the unde wiegth prevalnce in tow household groups.

Table 8c. Prevalence of underweight by sex of respondents in Woreda 01, Nifa Silk Lafto

	< 5 Children in HG hhs			< 5 Children in NHG hhs		
	All n= 89	Boys n = 50	Girls n= 39	All n=112	Boys n= 68	girls n= 54
Prevalence of total underweight (<-2 z-score)	(6) 6.74%	(4) 8%	(2) 5.12%	(5) 4.46%	(2) 2.94%	(3) 5.55%
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score	(3) 3.37%	(2) 4%	(1) 2.56%	(3) 2.67%	(2) 2.94%	(1) 1.85%
Prevalence of severe underweight (<-3 z-score	(3) 3.37%	(2) 4%	(1) 2.56%	(2) 1.78%	0	(2) 3.70%

Source: Researchers own findings

In general, the anthropometric result found that having a home garden was positively associated with height for age, because the total stunting prevalence in home garden was lower than non-home garden households (31.46% vs 33.33%). Though, the total prevalence of weight for height (wasting) of home garden was better than the non-home garden (13.4% vs 16%), it was not better

than the national average (10%). For both groups the weight for age (underweight) result for both group of households was very lower than the national average (24%).

4.1.6 Knowledge, Attitude and Practice of Households to Home Garden

4.1.6.1 Households Knowledge to Home Garden

Respondents were asked what they know about home garden. All of the home garden owners responded that home garden is to grow vegetables in the home compound, and the majority of the non-home garden households affirmed what was responded by home garden households. Majority of the home garden respondents (87%) told that home garden is a sources of nutrition dense food compared to households who had no home garden (56%). The home garden household respondent told that their garden brought income, reduces cost, increase variety of consumption and provide a hope and guarantee that can provide them something in case of food/cash shortage in their home. And, home garden provided them with fresh and ready to eat vegetables any time. Most of the non-home garden households (63 %) said that home garden is agriculture activity and it is difficult for them. According to respondents, the difficult activities for them were soil preparation, watering and follow up of home garden.

Regarding the contribution of home garden to the diet diversity of home consumption, all of home garden households (100%) of them said home garden used to diversify the food group as compared to their previous experience before establishing home garden. Households who had no home garden (74%) also agreed that home garden used to produce vegetables that can increase the diet diversity of household consumption but the remaining respondent's said that vegetables can better be purchased than growing and managing vegetable because it is time consuming and hard to manage. However, only few respondents from both groups who had better educational background had given detail explanation about the nutritional contents of vegetables (about the micro nutrients like vitamins). They said vitamins are useful for disease resistance and active growth.

Home garden house households received short term trainings about the agronomic managements of their garden, nutritional benefit of vegetables and close monitoring and advisory services. But, households who had no home garden didn't get this knowledge building service because there was no entry point to get these households.

4.1.6.2 Households Attitudes to Home Garden benefits

Summery response on the importance of home garden showed that 100% home garden households and 74% non-home garden households said that home garden is important. About (26%) of households who had no garden dislike the garden management and won't be interested to establish home garden even if they have land and input access because home garden is agriculture activity that is tedious and not comfortable to their safety and sanitation. They added that they better to purchase home garden produce from the market; it might be because some of them had money to purchase vegetables from the market.

4.1.6.3 Household Practice to Home Garden

Home garden beneficiary households confidently explained how their home diet was diversified after the home garden establishment unlike to the non-home garden user. However, having home garden didn't bring difference on the meal frequency of respondents after they started. Of course, the vegetable consumption frequency was higher for home garden households than households having no home garden (4days/week/ and 1 day/week respectively).

4.1.7 Challenges and Opportunities of Home Garden in Woreda 01, Nifas Silk Lafto

Based on the data from key informant interview, focus group discussions and household survey the following challenges were identified in the home garden sector in Woreda 01 of Nifas Silk Lafto Sub City, Addis Ababa. The most common challenges identified by this research were the following:

Lack of land has been identified as a common limitation for home gardening activities. Few respondents from home garden households and households with no home gardens stated that shortage of open space was the biggest problem for them. For families without adequate and secure access to land, lack of land was the single most important barrier to home gardening.

Water shortage was the biggest challenge faced by home gardeners. Although home gardens are primarily rain fed, it is common for home gardeners to irrigate during the dry season. Water shortage was the existing problem in the study area. Home gardeners were using tape water in most of the case and in some case they were using dirty river water to irrigate their vegetable. According to respondents, due to shortage of water their vegetables were wilted and their production was reduced from January-May 2021. Transporting and hand irrigating the home garden were the most tedious and time consuming activity.

Lack of knowledge, information, and advisory services could adversely affect the development of home gardens at any level while suitable advises and technology given at the right time could have a great impact on the progression of a home garden. And, limited access to agricultural inputs such as seeds and planting materials were mentioned by most of the respondents.

Poor soil fertility and lack of proper soil management was the observed problem. Naturally, vegetables need fertile soil condition but, no compost was added to improve the soil condition because they had no skill for compost preparation and had no market access to purchase it. Besides, poor management practice and lack of attention by the households was other problem mentioned by respondents. The time and frequency of home garden management trend of most of the households showed that there was no planned time given for their home garden. They managed only if they have no other things to do and there was no time allocated for this purpose. So, watering, hoeing, weeding, soil management were not planed activity.

Lack of sustainability of home garden was the challenge in the study woreda. After gardens started, there was no continuous management and it seems one stop activities, according to respondents. Changing the garden space to other purposes was observed during the data collection time. Most of the gardens infested by weeds and there was nutrient and water competition between the vegetables and weeds. Lack of research and improved technologies on home gardening was the identified challenge by the research. And, shed problem was reported by respondents as the other challenge.

Opportunities for Home Garden

There is favorable Government policy support. Starting from the Second Growth and Transformation Plan (GTP-II), the Federal Ministry of Agriculture has given attention to the urban agriculture sector. In addition, the Addis Ababa City Administration Farmers and Urban Agriculture Bureau had given attention to engage urban dwellers on home gardens to improve home nutrition and for income generation purpose. In the Sub City and the woreda urban agriculture experts were assigned to closely provide technical support and transfer inputs to the community. There is market access to sell extra produces and purchase of inputs. There was evidence observed from the research that home gardeners could able to sell their produce and generate income and expend it to purchase food items. So, there is market access not only for selling but also to purchase seeds/inputs. Support from Productive Safety Net Program (PSNP). PSNP program has been supporting and engaging vulnerable and poor households on safety net programs. Home gardening was taken as one strategy for income generation and for nutrition improvement. PSNP provides support on income generation, savings, input support and nutrition. Household labor availability is one opportunity to expand and establish home garden. Home garden activities were taken as extra time work where household labor mobilized without affecting the regular job time. So, there is abundant labor in the household to manage small plot of home garden. Availability of physical resources (land and water). Though land and water resources were considered as constraints at the household level, there are plenty of resources under the City and Sub City administrations.

4.2 Discussions

The socioeconomic statuses of respondents of the two groups, the home garden households and non-home garden households, was the same despite very little variation was found in their income level and education level. This was because home garden households were selected using different criteria and being a poor household was among the selection criteria. While targeting for home garden. And, there is slight difference in the level of food security statuses between the two group, home garden households and non-home garden households.

4.2.1 Household Food Security Statuses

Most home garden households generate market income from the sale of home garden vegetables. They sold some portion of their produce and used the money to purchase food items, soap, sugar, coffee, transport fee and other services. In addition, the money they were getting from the sale of the garden produces supporting their daily expenditure. According to the respondents, their purchasing power increased, this result agrees with (FAO, 2010) and Lannottie, et al (2009). The result showed that the economic benefits of home gardens contributed to income generation, improved livelihoods, and household economic welfare as well as promoting entrepreneurship and job creation which was similar to what was reported by Trinh, et al (2003); FAO (2010); Calvet-Mir, et al (2012).

However, the ownership of home garden was not significantly associated with the household food security statuses, this finding result was the same with Thamilini, J.et al (2019) but disagrees with Rammohan, et al (2019); FAO 2010 and Bongiwa and Obi, 2015. During the study it was learnt that poor households were purposely targeted for home garden in order to improve their nutritional statuses, creating job and for income generation purposes. And the assessment finding also confirmed that still majority of the respondents (57%) were food insecure households. Despite home garden gave them the chance to use fresh vegetables with no cost from the market, its contribution to food security improvements was very low/not known. Of course, households developed a habit of eating vegetables and purchasing consumable items which was not possible before the establishment of home garden. This explanation responds the research question which stated that "does home garden contribute better hh food security status?". The small size of home garden, lack of proper attention for garden management, input shortage and the various constraints identified by the research might have been contributed for unsatisfactory contribution of home garden to household food security improvement.

4.2.2 Household Diet Diversity

The assessment result showed that the diet diversity of households who had home garden was slightly higher than households without home garden (5.58 vs 5.26). It means that home garden has contributed to the diet diversity of households through creating access to purchase food items and directly consuming vegetables. So, household dietary diversity (HDDS) was positively associated with the presence of home gardens in the household. This result was similar with the finding of other researchers Selepe, 2010; Chauhan 2015; Bongawi&Obi 2015; Rammohan et al (2019).

The number of households consumed vegetables in the last 24 hours was higher for home garden households than households who had no home garden (66.9% vs 41%) out of the 115 samples from each group. So, this result showed positive response for the research question "does home garden improve dietary diversity?". In addition, the vegetables from the home garden not only benefit the households through direct consumption and income generation but also contributed to the community nutrition through market supply of fresh vegetables. However, the number of food groups consumed in both groups includes more of sugary foods, oil and fats and any other food (coffee/tea) and the consumption data for meat, fish and eggs was very minimal. The vegetable consumption frequency of households who had home garden was much higher than that of households who had no home garden (4days/week and 1day/week respectively). Few households, who had home garden responded that they couldn't use their garden vegetables every day because they didn't have money to purchase cooking oil. Due to this problem, few home gardeners were not utilizing their vegetable produce on the proper maturity stage of the vegetables.

From the results, the home gardens seem to have a significant positive effect on the increasing the dietary diversity of the children. A higher crop diversity practiced by the household also increases the dietary diversity. The summary results from diet diversity score tables showed that children from multi cropping households are likely to eat more vegetables. Home garden had given them the chance to produce not only for consumption but also for sell so that it gave them the chance to diversify consumption from the market.

4.2.3 Children Nutritional Statuses

The anthropometric result showed that there was positive association between having a home garden and children nutrition indicating that having a home garden leads to a better height-for-age outcome (31.46% vs 33.33%) for children in the home garden household and no home garden households respectively. This result conforms with Chauhan (2015) findings. In addition, there was also slightly positive association between home garden to weight-for-height outcome for children in the households (13.4% vs 16%). Though the research result of underweight was very low from the national average, there was no that much difference between home garden and non-home garden households. Stunting and wasting statuses of children was high in the households who have no home garden this result can be associated with various factors. In one hand, the number of households consumed vegetable in the last 24 hours might be high in home garden households and the vegetable consumption frequency/week of in this group of households was also high than the households who have no home garden. On the other hand, the anthropometric data and other information for some of households who have no home garden was collected from the health center attendants though they were the same woreda dwellers, so there might be health related problems for children who were visiting the nutrition unit at Lebu Health Center.

I found there is relationship between the diet diversity of households and children nutritional statuses. But, I didn't get direct association between food security statuses, diet diversity and child nutritional statuses. Because the food security statuses of home garden households slightly lower than the households having no home garden though the difference was not big. The better in diet diversity and children nutritional statuses of home garden households might be because they were engaged on home garden. In addition, the KAP assessment showed that households who have home garden had better understanding on the nutritional value of home garden vegetables, they got close follow up advices and awareness trainings by the woreda agriculture facilitators.

CHAPTER FIVE- CONCLUSION AND RECOMMENDATION

5.1 Conclusion

This research was carried out to understand the contribution of home garden to the household diet diversity and child nutritional statuses. This research used household food insecurity access scale, diet diversity score and anthropometric measurement to assess the roles of home garden to the household diet diversity and child nutritional statuses. Due to lack of baseline data, the home garden household's assessment data was compared with other community member's food and nutritional statuses who had no home garden. The results of this research support the benefits of home gardens in terms of contributing to food production and providing access to diverse sources of locally produced fresh and nutritious food to resource-poor families. Many of the vegetables crops grown in home gardens were locally preferred indigenous crops rich in vitamins, and minerals leading to healthy diets.

Overall, the results indicated that home gardens are providing a supplemental source of food and income for households in in Nifas Silk Lafto Sub City – Woreda 01 (Lebu) through the production of a diverse vegetables crops. This study showed that home gardens contributed to the household diet diversity, increase access to household food purchase and child nutritional statuses. Further, home gardening helped home-based employment opportunities especially for the poor and marginalized families in the area. The study concluded that home gardening practice is not associated with household food security improvement. And, the result didn't bring meaningful change to the household food security statuses though home garden households were witnessed that their purchasing capacity was increased after they begin to manage home garden. In addition, households with home gardening practices had better opportunity to use fresh and nutrient dense vegetables for consumption for four days in a week and had the chance for greater intake of Vitamin and mineral reach food which has the paramount contribution for children health.

Though home garden has contributed for household diet diversity and child nutritional statuses different challenges and constraints were identified through the research which had potential effect to reduce its contribution.

5.2 Recommendations

Long term sustainability strategy is required to benefit households from home garden intervention. As explained by the Nefas Silk and Lafto Sub City and Lebu Woreda farmers and urban agriculture offices, home garden interventions always begin in June. The plan was associated with the Government budget year planning and rain fall calendar. However, there are available resources (land and water) where household able to undertake home gardening throughout the year. Continuous support and technical assistance is highly essential to produce year round availability of fresh vegetables at the home garden level. Moreover, capacity building trainings on agronomic practices, nutritional importance of vegetables and market linkage information is required to help them sustain their home garden. Selling extra produces could help them not only to diversify consumption and cover some expenses but also it can help them purchase vegetable seeds for the next round plantation.

There is a great need to develop and implement research, educational and outreach programs, with increased focus on nutritional aspects, soil and pest management, composting, and integration of livestock to enhance the productivity and profitability of home gardens. The Woreda farmers and urban agriculture office in particular and the City Urban Agriculture office in general should consider demonstrations and experience sharing program in order to share experiences and discuss on the challenges. Agricultural extension could play their role in order to provide HHs with technical advice and follow-up. And, favorable policies and programs are needed to improve easy access to credit and land utilization for women job creation and gender equality and nutrition improvement.

Coordinated and integrated approach is very important to deal on the challenges and provide solutions for long term benefits to the large community. The identified challenges were not only from the agriculture sectors but also should be viewed from the urban land management, water and sanitation, inputs suppliers and other actor's perspective. So, coordinated planning and implementation of home garden is required.

This research study proposes two research ideas further research

Research is required to understand the contribution of home garden to household nutrition by taking baseline information prior to the start of the intervention. And, cost-benefit analysis of home gardening is very import for further advises and recommendation of home garden for nutritional, economic and women empowerment aspects.

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Appendices

Appendix I: Consent Form

My name is Goshu Seifu, I am a student at Addis Ababa University. Currently I am conducting a study on the role of home garden in improving household diet diversity and child nutritional status: the case of Woreda 01 (Lebu) in Nifas Silk Lafto Sub City, Addis Ababa, Ethiopia from April - May, 2021. So, I and data collectors will ask you questions about home garden, HFIAS, HDDS, and measure weight, height and age of children less than five years' age.

Whatever information you shall provide will be kept strictly confidential and will not be shown to any other persons and will be used only for the research purpose. Your participation for this study will be on voluntary basis. There is no any risk to you with responding to the question. By participating in this study and answering the question you will not receive any direct benefit. Depending upon the permission of the interviewee, name of respondents may or may not be included in this questionnaire paper.

..... …… …… …… ……

Name of Respondent Signature Date

Appendix II: Interview Guide

Instruction: in the questionnaire "skip" means move the next question as indicated**.**

I) Demographic and Socio- economic information

1. What is your name? **ስም?** _____
2. What is your Sex? ፃ□ Female ☐ Male ☐
3. How old are you? እድሜ _____ (year)
4. What is your religion? ሀ□**ማኖት**

Orthodox Tewahido ☐ Muslim ☐ protestant ☐ Catholic ☐ Others (specify) _____

5. What is your marital status? የጋብቻ ሁኔታ

   Married ☐ Single ☐ Divorced ☐ Separated ☐ Widow ☐

6. What is your level of educational? የትምህርት ደረጃ ☐
7. How many persons are in your household? **የቤተሰብ ብዛት**

   Male ☐ Female ☐ Total ☐

8. How many children below the age of 5 years are living in your household? **ልጆች ብዛት**

   Male ☐ Female ☐ Total ☐

9. Occupation፡ ስራ

Office work ☐ Whole seller ☐ Small shop ☐ Gulit retailing ☐ Service ☐

Others _____

11) Monthly household income (in birr) የገቢ መጠን _____

12) Monthly expenditure in (%) **የወር ወጪ ሁኔ**□

Food ☐ House rent ☐ School fee ☐ Transport ☐ Cloth ☐ Others_____

II) Home Garden Information: የጓሮ አትክልት ሁኔታ መረ□

1. Do you have home garden? **የጓሮ አትክልት** አለሽ/ህ Yes ☐ No ☐ If No, (skip to part III)

2. When did you start home garden? መቼ ጀምሮ? _____
3. Garden Size in meter square (□ቦታ ስፋት) _____; where is the garden? (የት ነ□) _____
4. Land for Home garden: ቦታ□ □ማነ□? Own/□□ኬ ☐ Rent/ኪራይ ☐ gift/ስ□□ ☐ Government/ የመንግስት ☐
5. What is the source of water? ውሃው ከየት ነው? _____
6. What you are you growing the in the garden? (list vegetables) (ምን ዓይነት የጓሮ አትክልት ተ□ለ□ል/ሻል

_____

7. What is the purpose of growing vegetable in the garden? □ጓሮ አትክልት የሚያመረቱት በዋናነት ለምን ጉዳይ ነው _____
8. If you are using vegetables for home consumption, how frequently you are preparing vegetables? በየስንት ጊዜው በቤት ውስጥ ይዘጋጃል? _____:
9. Are you feeding for <5 children? ከአምስት አመት በታች ል□ች□ን □መ□ባቸ□ል? Yes/አ□ ☐ No/አይመገቡም ☐ if No what are the reasons/

_____

10. Did you sell vegetables from own garden? አትክልት ይሸጣሉ? Yes ☐ No ☐ if the response is No skip Q11
11. For what purpose you used the income? (ከሽያጪ ያገኙትን ብር ለምን ይጠቀሙ□ታል?)

_____

12. Who controls the income and decides the expenditure? (ገቢውን የሚቆጣጠረውና ወጪን የሚወስነው ማነው)?_____
13. Who has been managing the garden (አትክልቱን ማነው የሚንከባከበው)? _____
14. What challenges you faced in the management of garden and consumption of vegetables foods? ምን ምን ችግሮች አጋጠማችሁ? ----------

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15. What are the opportunities to establish and benefit from home Garden? የጓሮ አትክልት ለማልማት ምን ምን ምቹ ነገሮች አሉ?

_____

_____

III) Household Food Insecurity Access Scale (HFIAS) measurement tool

Sr.No	Questions	Response option	Code
1	In the past four weeks, did you worry that your household would not have enough food? ባለፉት አራት ሳምንታት ውስጥ በቂ ምግብ አይኖረኝም ልብለው ሰግተው ያውቃሉ	0 = No (skip to Q2) 1=Yes 0 = አይ□**ለም** (ወ□ ጥያቄ 2 **ሂ**ት) 1=አዎ	….|___|
1.a	How often did this happen? ባለፉት አራት ሳምንታት ውስጥ ይሄ ስንት ጊዜ ደርሶብዎታል?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks) 1 = አሌፎ አሌፎ(አንዴ ወይም **ሁለ**ትጊዜ) 2 = **በአብዛኛ**□· (3-10 ጊዜ) 3 = **ሁል**ጊዜ (ከ 10 ጊዜ በሊይ)	….|___|
2	In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources ባለፉት አራት ሳምንታት ውስጥ በቂ ምግብ ወይንም ገንዘብ ባለመኖሩ ምግንያት አርስዎ ወይም ማንኛውም የቤተሰብ አባል የወደዱት ምግብ አለን?	0 = No (skip to Q3) 1=Yes 0 = አይ□**ለም** (ወ□ ጥያቄ 3 **ሂ**ት) 1= አዎ	….|___|

2.a	How often did this happen? ባለፉት አራት ሳምንታት ይህ ስንት ጊዜ ደርሶብወታል?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks) 1 = አሌፎ አሌፎ (አንዴ ወይም ሁለትጊዜ) 2 = በአብዛኛ□ (3-10 ጊዜ) 3 = ሁልጊዜ (ከ 10 ጊዜ በሊይ)	….|___|
3	In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources? ባለፉት አራት ሳምንታት ውስጥ በቂ ምግብ ወይም ገንዘብ ባለመኖሩ ምክንያት ርስዎ ወይም ማነኛውም የቤተሰብ አባል በቂ ያልሆነ ምግብ ተመግበው ነበር	0 = No (skip to Q4) 1 = Yes 0 = አይ□ለም (ወ□ጥያቄ 4 ሂዱ) 1= አዎ	….|___|
3.a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks) 1 = አሌፎ አሌፎ (አንዴ ወይም ሁለትጊዜ)	….|___|

	ባለፉት አራት ሳምንታት ይህ ስንት ጊዜ ደርሶብዎታል	2 = **በአብዛኛ**ው (3-10 ጊዜ) 3 = ሁ**ል**ጊዜ (ከ 10 ጊዜ በሊይ)	
4	In the past four weeks, did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food? ባለፉት አራት ሳምንታት ውስጥ በቂ ምግብ ወይም ገንዘብ ባለመኖሩ ምክንያት ርስዎ ወይም ቤተሰብዎ መመገብ የማትፈልጉትን ተመግብችኃል?	0 = No (skip to Q5) 1 = Yes 0 = አይ**ለም** (ወ ጥያቄ 5 **ሂ**ት) 1= አዎ	….|___|
4.a	How often did this happen? ባለፉት አራት ሳምንታት ይህ ስንት ጊዜ ደርሶበዎታል?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks) 1 = አሌፎ አሌፎ (አንዴ ወይም ሁ**ለ**ትጊዜ) 2 = **በአብዛኛ**ው (3-10 ጊዜ) 3 = ሁ**ል**ጊዜ (ከ 10 ጊዜ በሊይ)	….|___|
5	In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	0 = No (skip to Q6) 1 = Yes 0 = አይ**ለም** (ወ ጥያቄ 5 **ሂ**ት) 1= አዎ	….|___|

	ባለፉት አራት ሳምንታት ቤት ውስጥ በቂ ምግብ ባለመኖሩ ምክንያት ርስዎ ወይም ማንኛውም የቤተሰብ አባል ሳትጠግቡ ለመነሳት ተገዳችኋል?		
5.a	How often did this happen? ባለፉት አራት ሳምንታት ይህ ስንት ጊዜ ደርሶ ነበር?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks) 1 = አሌፎ አሌፎ (አንዴ ወይም ሁለትጊዜ) 2 = በአብዛኛ□ (3-10 ጊዜ) 3 = ሁልጊዜ (ከ 10 ጊዜ በሊይ)	….|___|
6	In the past four weeks, did you or any other household member have to eat fewer meals in a day because there was not enough food? ባለፉት አራት ሳምነታት ውስጥ በቂ ምግብ ባለመኖሩ ምክንያት ርስዎ ወይም ማንኛውም የቤተሰብ አባል ቁርስ፡ምሳ፡ ወይም እራት ሳትመገቡ ቀርታችኃል?	0 = No (skip to Q7) 1 = Yes 0 = አይ□ለም (ወ□ ጥያቄ 5 ሂዱ) 1= አዎ	….|___|

6.a	How often did this happen? ባለፉት አራት ሳምንታት ይህ ስንት ጊዜ ደርሶ ነበር?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks) 1 = አሌፎ አሌፎ (አንዴ ወይም ሁለትጊዜ) 2 = በአብዛኛ□· (3-10 ጊዜ) 3 = ሁልጊዜ (ከ 10 ጊዜ በሊይ)	….|___|
7	In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food? በለፉት አራት ሳምንታት ውስጥ በቂ ምግብ ዎይም ገንዘብ በለመኖሩ ምክንያት ምንም ዓይንት ምግበ ማግኘት ያልተገኘበት አጋጣሚ ነበር?	0 = No (skip to Q8) 1 = Yes 0 = አይ□ለም (ወ□ ጥያቄ 5 ሂ·) 1= አዎ	….|___|
7.a	How often did this happen? በለፉት አራት ሳምንታት ይህ ስንተ ጊዜ አጋጥሞ ነበር?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks) 1 = አሌፎ አሌፎ (አንዴ ወይም ሁለትጊዜ) 2 = በአብዛኛ□· (3-10 ጊዜ)	….|___|

		3 = ሁልጊዜ (ከ 10 ጊዜ በሊይ)	
8	In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food? በላፉት አራት ሳምንታት ውስጥ በቂ ምግብ ባለመኖሩ ምክንያት ርስዎ ወይም ማንኛውም የቤተሰብ አባል አራት ሳያገኝ የተኛ ነበር?	0 = No (skip to Q9) 1 = Yes 0 = አይ□ለም (ወ□ ጥያቄ 5 ሂት፡) 1= አዎ	….|___|
8.a	How often did this happen? በለፉት አራት ሳምንታት ይህ ስንተ ጊዚ አጋጥሞ ነበር?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks) 1 = አሌፎ አሌፎ (አንዴ ወይም ሁለትጊዜ) 2 = በአብዛኛ□፡ (3-10 ጊዜ) 3 = ሁልጊዜ (ከ 10 ጊዜ በሊይ)	….|___|
9	In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food? በለፉት አራት ሳምንታት ርስዎ ወይም ማንኛውም የቤተሰብ አባል በቂ ምግበ ባለመኖሩ ምክንያት ምንም ምግብ ሳይመገብ ቀንና ሌሊቱን የዋለ ነበር?	0 = No (questionnaire is finished) 1 = Yes 0 = አይ□ለም (ወ□ ጥያቄ 5 ሂት፡) 1= አዎ	….|___|

9.a	How often did this happen? በባለፉት አራት ሳምንታት ይህ ስንት ጊዜ አጋጥሞ ነበር?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks) 1 = አሌፎ አሌፎ (አንዴ ወይም ሁለትጊዜ) 2 = በአብዛኛ□ (3-10 ጊዜ) 3 = ሁልጊዜ (ከ 10 ጊዜ በሊይ)	….|___|

IV) **Household dietary diversity data collection**

Now, I would like to ask you about the types of foods that you or anyone else in your household ate yesterday during the day and at night. Read the food lists and underline in the list if the household responds.

Write additional in the space provided if the respondent adds additional food that is not indicated in the list.

Food Categories	**Food list**
a. Cereals የአህል □□ነቶች	Bread, Porridge, Biscuits, Injera with shiro wat, Injera with meat wat'bread with tea, beye-ayinetu, ዳቦ ፣ ገንፎ ፣ ብስኩት፣ እንጆራ በሽሮ ፣ እንጆራበስ□ □ዓ ፣ በየዓይነቱ
b. Root and Tuber crops ስራቸው ወይም ቱበራቸው የሚበላ	potato, Sweet potato, Yam, ዳድንች ጣፋጭ ድንች □ም
	Green Leafy vegetables, Carrot, Pumpkin,

c. Vegetables **አትክልቶች**	**አረንጓዴ አትክልቶች ፣ከሮት፣ዱባ**
d. Fruits **አራአሬ**	Mango, Papaya, orange, lemon, **ማንጎ፣ ፓፓያ፣ ብርቱከን ፣ሎሚ**
e. Meat/poultry **ስ□**	Chicken meat, beef, goat& sheep meat, **□□ሮስ□፣ □ክሬ ስ□፣ □አ□ል ስ□ ፣□ክ□ስ□**
f. Eggs? **አንቁላል**	Eggs from poultry **አንቁላል**
g. Fish **አሳ**	Any fresh or dried fish or shellfish? **አሳ**
h. Legumes **ዓራዓሬ**	Any foods made from beans, peas, lentils, or nuts **ጥራጥሬ ሰብሎች እንደ አተር ፣ ባቄላ፣ ምስር፣ ለ□ሁ□**
i. Milk and milk products **ወተትና የወተት ውጤቶች**	cheese, yogurt, infant formula, butter, **አይብ፣□ርያ ፣□ህፃናት □ተት፣ ቅቤ**
j. Oil and fat **ዘየትና ቅባቶች**	Any foods made with oil, fat, or butter **ዘይት፣ ቅባት፣**
k. Sugary foods **□ኛ□**	Sugar, honey, chocolate **ስኳር፣ማር፣ቸኮሌት**
l. Any other foods **ሌሎች**	coffee, tea **ቡና፣ ሻይ**

V) Anthropometry measurement

No	Infant name (code)	Sex	Age	Height in centimeter	Weight in Kg

VI) Knowledge, attitude and Practice questions

Knowledge

1) Is home garden important for nutrition improvement? Yes ☐ No ☐ (If no skip to Q3)
2) How home garden is important for home nutrition improvement?

   _____
3) Did you receive training on home garden? Yes ☐ No ☐ (If no skip to Attitude part)
4) What was the training about? _____

Attitude

1) How your families see the home garden? Important ☐ useless ☐ it is not known ☐
2) Are all your family members interested for home garden vegetables? Yes ☐ No ☐ (if your response is yes/no, indicate your reason under Q3)
3) What is the reason _____

Practice

1) How could you explain the food diversity at your home after home garden started?
2) How could you explain the meal frequency at your home after home garden?

VII) Key Informant Interview Guide

1. What are the challenges of Urban Garden/Home Garden? What can be the solution for problems?
2. What are the opportunities for urban garden/home garden?

VIII) Focus Group Discussion Guide

1. What is the purpose of growing vegetable in home garden?
2. How could you explain the benefits of home garden?
3. Have you ever been involved on any trainings related to home garden? example, agronomic activities, utilizations?
4. What challenges you have faced on home garden?

Appendix III: Identified economic activities respondents were engaged on

Service sector activities

Food services

Coffee and tea

Environmental sanitation

House made

Broker

Cloth Washing

Hotel and restaurant services

Guard service

Driving

Agriculture

Vegetable growing

Cereal production

Trade sectors

Whole selling

Small shop

Guilt (vegetable retailing, *Kolo* selling, enjera selling)

Construction sector

Masonry work

Painting

Carpenter

Industry sector/manufacturing

Wood work

Metal work